XFWS-A 595 1-6 (1970)
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Size, Seasonal Abundance, and Length-Weight Relation of Some Scombrid Fishes from Southeast Florida

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United States Fish and Wildlife Service
Special Scientific Report--Fisheries No. 595

Washington, D.C.
May 1970

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ABSTRACT

Seven species of scombrid fishes were sampled for length and weight at a taxidermy firm for 1 year (September 1967-September 1968). These data yielded information on size distribution and seasonal abundance of the species off south Florida. In addition, length-weight relations and calculated weights at given lengths are presented.

INTRODUCTION

Because the southeast coast of Florida from Palm Beach to Key West is one of the major centers of salt-water sport fishing in the United States, samples of a variety of fish are available for scientific study. In 1967 TABL (Bureau of Commercial Fisheries Tropical Atlantic Biological Laboratory) in Miami began sampling several species of scombrid fishes received from sport fishermen for mounting by Al Pflueger, Inc., a large taxidermy firm in Hollywood, Fla. The species sampled were: wahoo, Acanthocybium solanderi; little tuna, Euthynnus alletteratus; skipjack tuna, Katsuwonus pelamis; king mackerel, Scomberomorus cavalla; Spanish mackerel, S. maculatus; cero, S. regalis; and blackfin tuna, Thunnus atlanticus. This sampling was undertaken to determine the seasonal presence of scombrids in the area in conjunction with sampling for their larvae in the Straits of Florida. Since no commercial fishery for most of the species exists in this area, we had to turn to the well-developed sport fishery.

TABL personnel visited the taxidermy plant each week from September 1967 through September 1968 to examine fishes received the previous week from the company's various collecting points along the south Florida coast. We did not sample specimens from locations other than south Florida. We measured length and weight only. Fork length was recorded to the nearest millimeter; weight was taken to the nearest 0.1 pound and was later converted into kilograms.

Certain problems arise in evaluating samples of fish from a taxidermy company. Usually only the largest individuals caught are preserved and mounted; size frequencies are affected accordingly. Apparent seasonal changes in abundance may reflect merely a difference in the number of fishermen and a resulting increase or decrease in the number of fish received for mounting. Despite these problems we believe that these data are important enough to warrant presentation--for the most part they give a reasonably accurate picture of seasonal changes in size and abundance of these fishes along the southeast coast of Florida.

SIZE DISTRIBUTION AND RELATIVE APPARENT ABUNDANCE

Fork lengths of wahoo, little tuna, skipjack tuna, king mackerel, and blackfin tuna were separated by quarters of the year and arranged into appropriate centimeter groupings. The length frequencies were plotted. Too few cero and Spanish mackerel were collected to treat in this manner.

Wahoo

The wahoo is a highly prized game fish, and probably a higher percentage are retained for mounting than any of the other species discussed; hence seasonal abundance and size distribution as represented by our samples are probably more valid for wahoo than for any of the other species we studied.

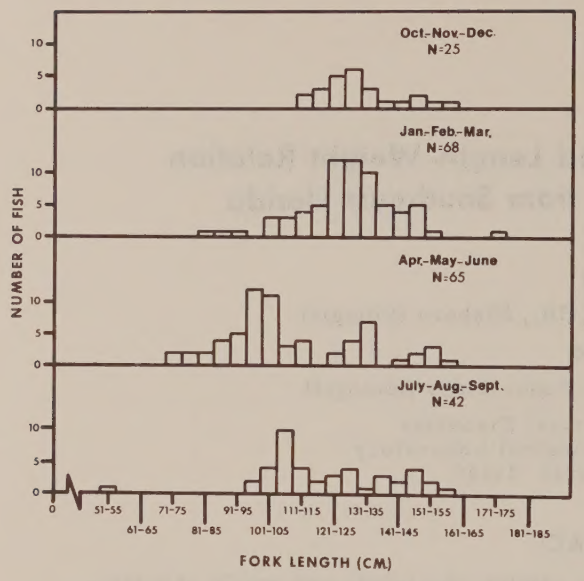

Figure 1.--Length frequency distributions by quarters of the year for wahoo sampled from a taxidermy plant in south Florida from September 1967 through September 1968.

Wahoo are most abundant off southern Florida in winter (fig. 1). LaMonte (1951) reported that wahoo are taken off Hatteras, N.C., from June to October and are rare or absent at other times. Off Bermuda a minor run occurs in April, and abundance is at a peak in September and October (Mowbray, 1956). In spring a large number of relatively small (96 to 105 cm.) wahoo appear off the lower Florida coast, in summer the mode representing this group of fish (July-September, fig. 1) progressed slightly, indicating growth of about 3 to 4 cm. per month.

Little Tuna

Little tuna are one of the most common tunas caught by sport fishermen off southern Florida and are most abundant in summer (fig. 2). According to de Sylva and Rathjen (1961) little tuna are most abundant in the catch of sport fish in south Florida from April through August with a peak in June. Our samples show that little tuna of 66 to 75 cm. fork length are dominant in the south Florida sport-fish catch throughout the year.

Skipjack Tuna

Skipjack tuna, which have become increasingly important to the worldwide commercial tuna catch in recent years, are most abundant off Florida in fall and winter. The large mode in October-December (fig. 3) disappeared in the next quarter although the single low peak at 63 to 64 cm. may represent this group of fish. The peak reappeared in April-June at about 65 to 68 cm., possibly representing growth of about 1 cm. per month. Brock (1954) and Rothschild (1967) showed growth rates for skipjack tuna in the Pacific of 1.5 to 2.0 cm. per month. The dominant mode in our samples in January-March disappeared in April-June, and a new peak appeared at 42 to 43 cm., which indicated that a number of small fish had moved into the south Florida area.

King Mackerel

The king mackerel, a migratory species, is most abundant in the winter off southern Florida where an important fishery for the king and Spanish mackerels is carried on--in 1967 more than 750 metric tons of king mackerel and 1,300 metric tons of Spanish mackerel were landed (Bureau of Commercial Fisheries, 1968).

The three modes present in the January-March quarter (fig. 4) suggest the presence of only three age groups in the sport-fish catch off southern Florida. According to a study of age and growth of king mackerel in Brazil by Nomura and Rodrigues (1967), however, the size range represented in figure 4 (January-March) would include their age-groups IV (62 cm.) through XII (120 cm.). Catches off Florida are few in summer, and most king mackerel caught are relatively small.

Blackfin Tuna

Blackfin tuna, which represent a potentially valuable commercial resource in the Gulf of Mexico and Caribbean Sea, are abundant off southern Florida throughout the fall, winter, and spring, but sport-fish catches decline sharply in the summer (fig. 5). The blackfin is one of the more abundant tunas in the Gulf and Caribbean but is fished commercially only in Cuba, where there is an active live-bait fishery for blackfin and skipjack tunas off the southern coast. Blackfin tuna make up about two-thirds of the catch (Suarez Caabro and Duarte Bello, 1961), and though peak abundance is from April to July, the fish are present throughout the year. In our samples the first mode, in October-December (fig. 5), appeared to progress from about 47 to 48 cm. to about 51 to 52 cm. in April-June, which suggested a growth of slightly under 1 cm. per month, similar to that indicated for skipjack tuna. The second mode in April-June can possibly be traced back to the large peak at 55 to 56 cm. in October-December, indicating growth of about 1.5 cm. per month.

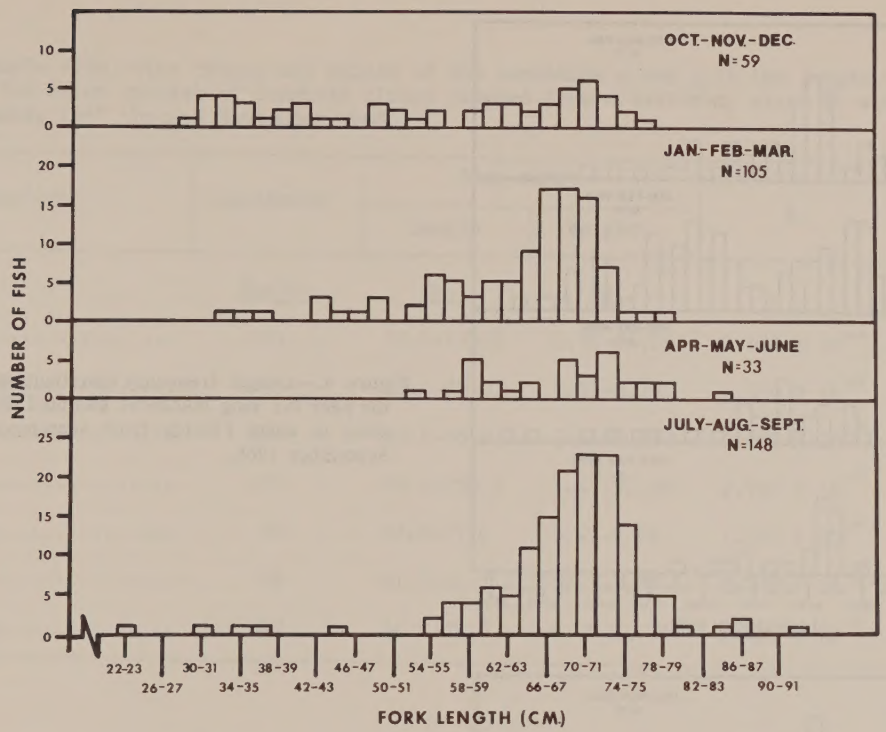

Figure 2.--Length frequency distributions by quarters of the year for little tuna sampled from a taxidermy plant in south Florida from September 1967 through September 1968.

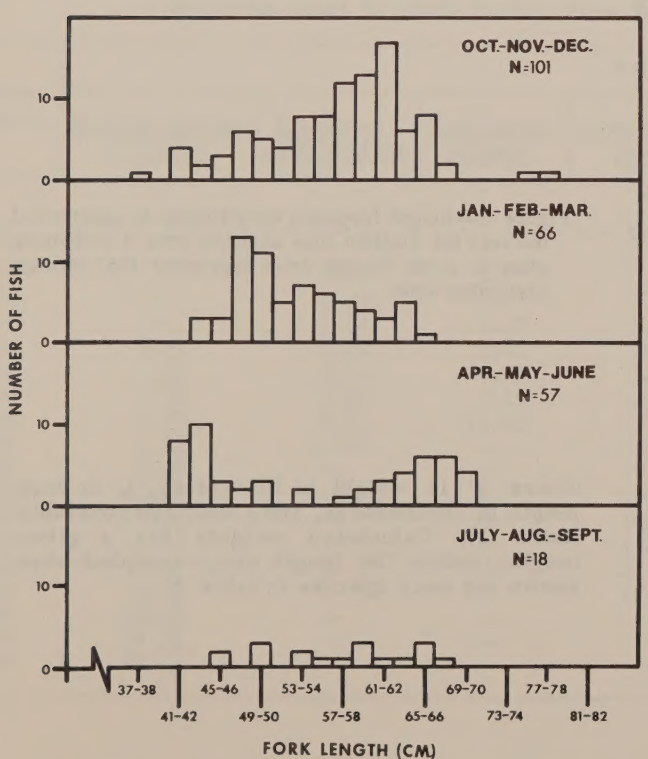

Figure 3.--Length frequency distributions by quarters of the year for skipjack tuna sampled from a taxidermy plant in south Florida from September 1967 through September 1968.

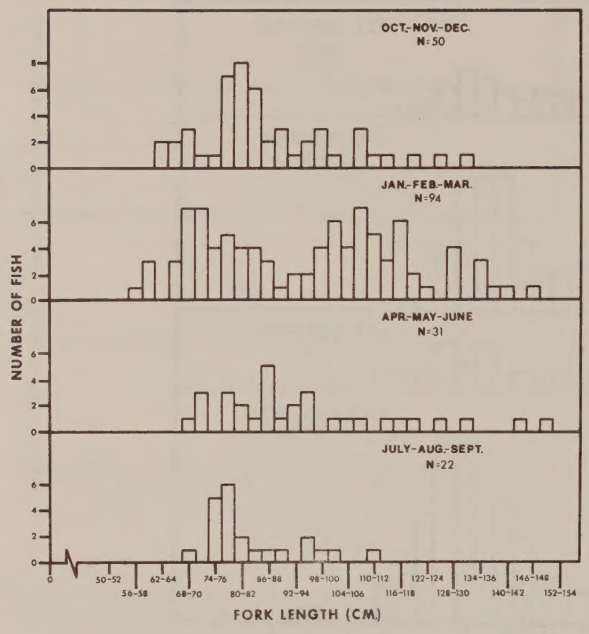

Figure 4.--Length frequency distributions by quarters of the year for king mackerel sampled from a taxidermy plant in south Florida from September 1967 through September 1968.

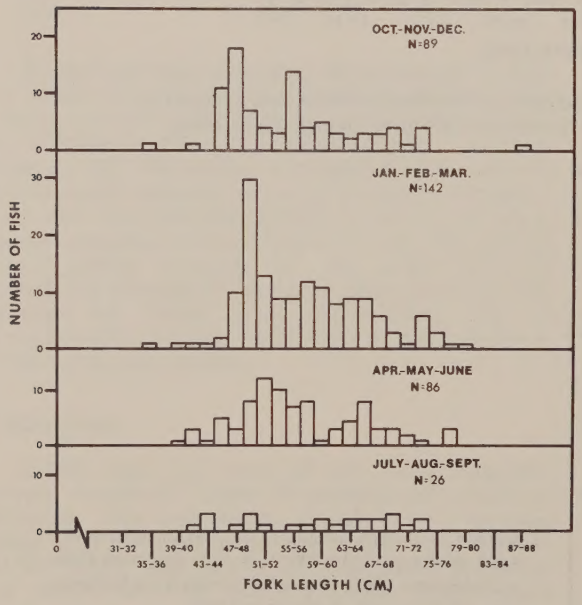

Figure 5.--Length frequency distributions by quarters of the year for blackfin tuna sampled from a taxidermy plant in south Florida from September 1967 through September 1968.

LENGTH-WEIGHT RELATIONS

The relation between length and weight for each species was calculated by the method of least squares with the equation

$$W = aL^b$$

or

$$\log_{10} W = \log_{10} a + b \log_{10} L$$

where W is weight in kilograms, L is fork length in centimeters, and a and b are constants (table 1). Calculated weights for a given length--within the length range sampled--are shown for each species in table 2.

Table 1.--Sample size, size range, and values of the constants a and b in the length-weight equations for seven species of scombrid fishes sampled from a taxidermy plant in south Florida from September 1967 through September 1968

Species	Specimens	Size range		a	b
		Length	Weight		
	Number	Cm.	Kg.		
A. solanderi.....	201	53.4-172.0	0.91-36.29	1.544×10^{-6}	3.29389
E. alletteratus.....	343	23.1-85.8	0.23-8.39	4.956×10^{-6}	3.26314
K. pelamis.....	244	37.5-78.0	0.91-9.98	7.927×10^{-5}	3.22750
S. cavalla.....	197	58.5-150.0	1.47-32.09	2.701×10^{-6}	3.23000
S. maculatus.....	35	33.0-77.0	0.45-4.76	1.053×10^{-5}	2.95842
S. regalis.....	58	21.3-83.5	0.13-4.88	1.236×10^{-5}	2.92491
T. atlanticus.....	347	34.5-87.0	0.75-11.79	1.810×10^{-5}	3.02838

Table 2.--Lengths and weights calculated for seven species of scombrid fishes sampled from a taxidermy plant in south Florida from September 1967 through September 1968

Fork length	Weight						
	Acanthyocybium solanderi	Euthynnus alletteratus	Katsuwonus pelamis	Scomberomorus cavalla	Scomberomorus maculatus	Scomberomorus regalis	Thunnus atlanticus
Cm.	Kg.						
20	--	0.11	--	--	--	--	--
30	--	0.33	--	--	0.25	0.26	0.54
40	--	0.84	1.17	--	0.58	0.60	1.29
50	0.61	1.73	2.41	0.83	1.20	1.15	2.53
60	1.11	3.14	4.35	1.50	1.92	1.96	4.39
70	1.85	5.20	7.15	2.46	3.03	3.08	7.00
80	2.87	8.04	11.02	3.79	4.50	4.55	10.49
90	4.22	11.81	--	5.54	--	--	14.97
100	5.98	--	--	7.79	--	--	--
110	8.18	--	--	10.59	--	--	--
120	10.91	--	--	14.04	--	--	--
130	14.18	--	--	18.18	--	--	--
140	18.10	--	--	23.09	--	--	--
150	22.72	--	--	28.86	--	--	--
160	28.10	--	--	--	--	--	--
170	34.31	--	--	--	--	--	--
180	41.42	--	--	--	--	--	--

ACKNOWLEDGMENTS

Al Pflueger, Jr., and Jerry Webb of Al Pflueger, Inc., gave us their cooperation and assistance in obtaining these data.

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